USER MANUAL

MODEL IM 1/F

G. 703 Interface Module

PATTON Electronics Co.

Part# 07MIM1F-B
Doc# 090071UB
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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model IM 1/F components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 RADIO AND TV INTERFERENCE

The Model IM 1/F generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Model IM 1/F has been tested and complies with the limits for a Class A computing device in accordance with the specification in Subpart J of Part 15 of FCC rules, that are designed to provide reasonable protection from such interference in a commercial installation. However, this is no guarantee that interference will not occur in a particular installation. If the Model IM 1/F does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, reorienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 SERVICE

All warranty and nonwarranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at: **(301) 975-1007, http://www.patton.com**; **support@patton.com**.

Note: Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model IM 1/F. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact us at: **(301) 975-1007, http://www.patton.com**; **support@patton.com**.

2.1 FEATURES

- Designed for use with Patton Electronics Access products that receive QuickConnect™ Modules and support 64K or 128K synchronous rates.
- Provides 64K codirectional interface compliant with the G.703 electrical specs.
- Offers a single Tx/Rx interface with a standard RJ-45 connector as specified in TBR 14.
- Option to work in two timing modes: Clear channel or octet timing.
- Complies with ITU/CCITT G.823 (Control of Jitter).
- Point-to-point distance up to 4,000 feet (1219m) using 24 AWG twisted pair.
- Made in the U.S.A.

2.2 DESCRIPTION

The Patton Model IM 1/F Interface Module converts data from a 64K G.703 network into a Transistor-Transistor Logic (TTL) compatible signal that is transported by the PE 1090 or 1092 Modem or a similar 2 or 4 wire short haul modem that has identical pin outs and edge connector style (see note, below). The G.703 network provides a 64K codirectional three level signal using either octet timing or clear channel mode. The IM will detect and pass either octet timing (preserving byte integrity over a 128kbps modem link) or clear channel timing (without byte integrity preservation) over a 64Kbps modem link. The IM is capable of handling either network timing or modem timing, thereby realizing network extension or network replacement configurations. Clock jitter is attenuated according to G.823.

2.3 SYSTEM DESCRIPTION

This section describes the features that the entire system (G.703 interface, combined with the modems) will support.

NOTE: The “smoothed” clocks referred to in this section indicate that a phase locked VCO is used to create a jitter free clock that is locked to a source clock.

2.3.1 APPLICATIONS AND ASSOCIATED TIMING

There are two typical applications that result in two different timing modes for the G.703 interface. These are illustrated below.

Timing of Application 1: Network Loop Extension

In this application, the network supplies the timing for the entire system. The first G.703 recovers the timing. It has to smooth the clock before it supplies the clock (XCLK1) and the data (TXD1) to the first modem transmitter, so it can directly use the clock. The Rx of the second modem recovers the clock and presents a “jittery” clock (RXCLK1) and data (RXD1) to the second G.703’s transmitter. This transmitter has to smooth the clock before it uses the clock to transmit.

The Rx of the second G.703 recovers the timing and clocks the data into a FIFO. The Tx of the second modem takes its recovered clock and sends it (TXCLK1) to the G.703 FIFO for data (TXD1). The Rx of the first modem recovers the timing and clocks (RXCLK1) the data (RXD1) into a FIFO. The Tx of the first G.703 uses the first G.703’s recovered clock and sends it to the FIFO for data.

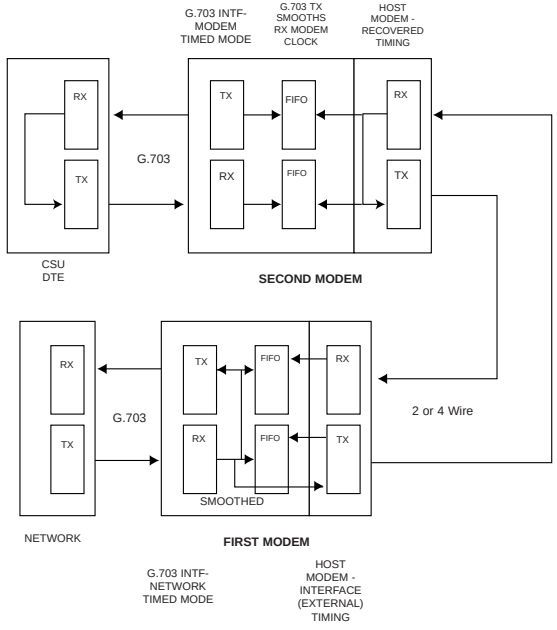


Figure 1. Network Loop Extension Configuration

The first G.703 interface is in **Network Timed** mode. The second is in **Modem Timed** mode. See Figure 1 above.

Timing of Application 2: Network Replacement

The first modem uses an internal timing source and supplies the timing for the entire system. The first G.703 recovers the timing and clocks the data into the FIFO. The Tx of the first modem takes its internal clock and sends it (TXCLK1) to the G.703 FIFO for data (TXD1). The Rx of the second modem recovers the clock and presents a "jittery" clock and data to the second G.703's transmitter. It has to smooth the clock before it uses the clock to transmit.

The Rx of the second G.703 recovers the timing and clocks the data into a FIFO. The Tx of the second modem sends the second modem's recovered clock (TXCLK1) to the G.703 FIFO for data (TXD1). The Rx of the first modem uses its internal clock (RXCLK1) to send data (RXD1) into the FIFO. The Tx of the first G.703 smooths the first modem's recovered timing and sends it to the FIFO for data.

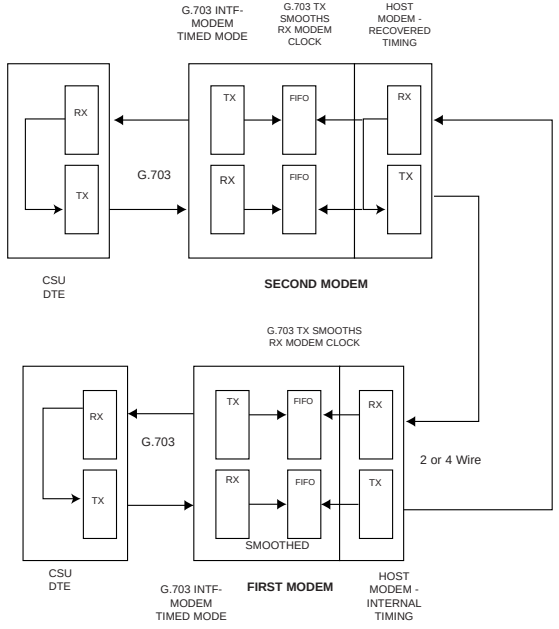


Figure 2. Network Replacement Configuration

Both G.703 interfaces are in **Modem Timed** mode. See Figure 2 above.

2.4 TIMING MODE SELECTIONS

Based on the timing arrangements and clock sources mentioned above, there are two timing modes in which the interface can work. These two modes select the clock sources mentioned above and determine which clock gets smoothed.

Network Timed - This sets the interface to pass the smoothed recovered timing to the modem as XCLK1, with the Rx data as TXD1, and also to the G.703 Tx side.

Modem Timed - This sets the interface to use the modem's Tx timing (recovered or internal source) to send the Rx data (as TXD1) to the modem and to smooth the modem's recovered timing for transmitting on the G.703 Tx side.

In both cases, the transmitter uses the smoothed clock.

2.5 OPERATING MODE SELECTIONS

There are two data modes in which the interface passes data and timing:

Octet Mode - Data is passed at a 128K rate. This mode preserves the byte integrity associated with Octet timing. The Octet timing frame is embedded in the data.

Clear Channel Mode - Data is passed at a 64K rate. This does not preserve the byte integrity associated with Octet timing. Instead, an Octet timing alarm (on or off) is passed over the modem similar to the way signaling leads are passed.

3.0 CONFIGURATION

The Model IM 1/F is equipped with four DIP switches that allow configuration of the unit to match your application. These DIP switches are located on the top side of the module. Refer to Figure 3 below for a description of the DIP switches location on the module and a summary table detailing their settings.

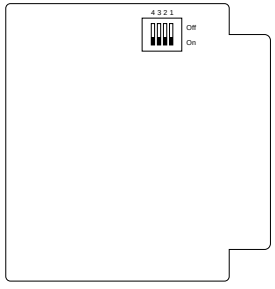


Figure 3: Top Side of IM 1/F, Dip Switch Location

The following table defines the possible configurations of the IM 1/F using the configuration DIP switch, S1. Factory defaults are in **bold-face**.

Switch	On	Off
S1-1	Modem Timed	**Network Timed**
S1-2	Not Used	**Not Used**
S1-3	**Clear Channel Mode**	Octet Mode
S1-4	**Normal Operation**	Reserved for Factory Use

NOTE: S1-4 must be “On.”

4.0 INSTALLATION

Once the Model IM 1/F is properly configured, it is ready to install into a PE 1090 or 1092. This section tells you how to properly connect the Model IM 1/F.

4.1 CONNECTION TO THE MODEM’S SERIAL PORT

The QuickConnect™ module has a 50 pin card edge connector on one side and an RJ-45 connector on the other side. Figure 4 shows how a QuickConnect™ module plugs into the back of a Patton Electronics Model 1090 or Model 1092.

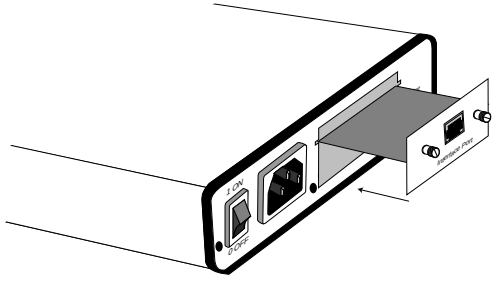


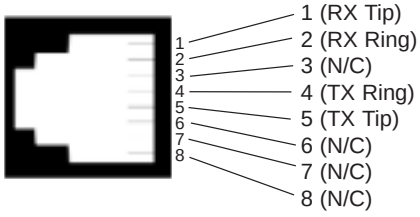
Figure 4. Installation of Model IM 1/F Plug-in Serial Interface Module

4.2 CONNECTION TO THE TWISTED PAIR INTERFACE

The Model IM 1/F supports communication between itself and a G.703 PCM network at distances up to 4,000 feet (1219m) using 24 AWG twisted pair cable.

To function properly, the Model IM 1/F requires two twisted pairs of metallic wire. These twisted pairs must be unconditioned, dry metallic wire, between 22 and 26 AWG (0.4mm to 0.6mm diameter solid conductors). Higher gauge wire may limit distance. Flat modular telephone type cable is not acceptable.

The RJ-45 connector on the Model IM 1/F twisted pair interface is pre-wired according to the signal/pin relationships shown in Figure 5 below.



Pin	Signal Name	Direction (In reference to IM)	Function
1	RD(T)	IN	Receive data in (tip)
2	RD(R)	IN	Receive data in (ring)
3			Not used
4	TD(R)	OUT	Transmit data out (ring)
5	TD(T)	OUT	Transmit data out (tip)
6			Not used
7,8			Not used

Figure 5. Model IM 1/F Twisted Pair Interface Signal/Pin Relationship

Important: Connection of the Patton G.703 IM to a **CSU DTE** requires a crossover twisted pair cable. Connection of the G.703 IM to a **PCM network** requires a straight through twisted pair cable. If you need more assistance with cable selection and preparation, contact Patton Technical Support at **(301) 975-1007.** Additional assistance at our website, **http://www.patton.com**, or at our e-mail address at **support@patton.com**.

APPENDIX A
SPECIFICATIONS

Applications:	64K G.703 codirectional PCM network extension or network replacement
Connector:	Symmetrically balanced pair, 4 wire RJ-45 female
Interface:	Entire module plugs into Patton Electronics 1090 or 1092 Modem
Operating Modes/Speed:	Supports octet mode or clear channel mode Co-directional timing, Rx recovered: 64Kbits ± 500ppm Octet Timing auto detect on receiver
Line Coding:	AMI with block violation for octet timing
Timing Modes:	Supports network timing mode or modem timing mode
Transmit Level:	2.0V differential, into 100 Ohms, nominal
Load Impedance:	120 Ohms
Input Signal Level:	0 to -10dB
Jitter Performance:	CTR 14, G.823. <0.05UI jitter for network extension applications
Isolation:	2000 VRMS isolation, transformer coupled
PC Board Dimensions:	2.950” X 3.200”, QuickConnect™ Interface Module size
Compliance:	FCC Class A EN 50081-1, Emissions EN 50082-1, Susceptibility Designed for compliance with CTR 14